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ALUMINIZED FIREMEN'S (FIRE PROXIMITY) HANDWEAR: REDESIGN OF EXP--ETC(U)  
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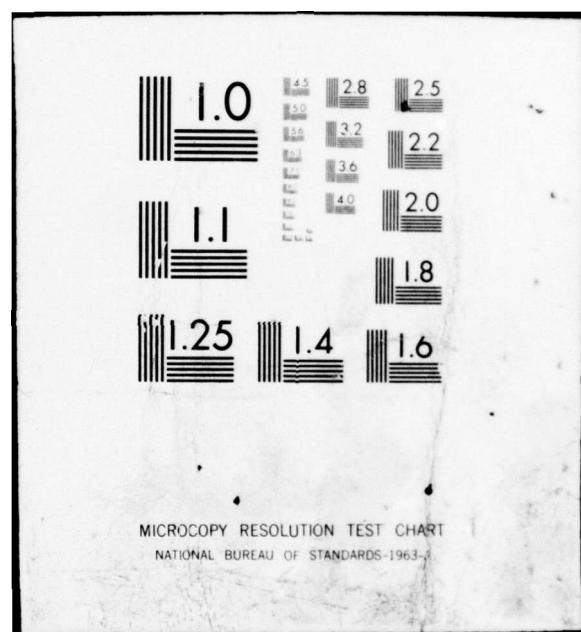


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# **Aluminized Firemen's (Fire Proximity) Handwear - Redesign of Experimental Prototype**

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DECEMBER 1978



FINAL REPORT FOR PERIOD OCTOBER 1976 - SEPTEMBER 1977

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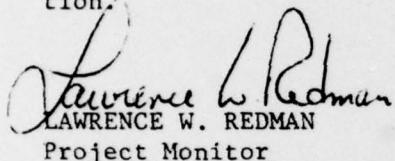
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PREFACE

This work effort was conducted by personnel of the Navy Clothing and Textile Research Facility (NCTR), 21 Strathmore Road, Natick MA 01760. The NCTR project manager was Francis S. Andruk. The work was sponsored by Detachment 1 (Civil and Environmental Engineering Development Office) ADTC, Tyndall Air Force Base FL under Contract No. 77-002. Maj B.T. Pease was the Air Force project manager for this program.

This report has been reviewed by the Information Office (IO) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

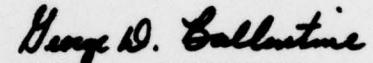
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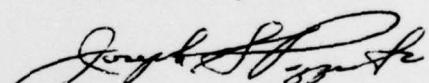
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## TABLE OF CONTENTS

Section	Title	Page
I	INTRODUCTION.....	1
II	DISCUSSION.....	3
III	CONCLUSIONS AND RECOMMENDATIONS.....	5
	REFERENCES.....	6

## LIST OF FIGURES

Figure	Title	Page
1	Final Prototype of Improved Model of Aluminized Firemen's (Fire Proximity) Handwear.....	2

SECTION I  
INTRODUCTION

The Navy Clothing and Textile Research Facility (NCTR) previously developed experimental aluminized fire proximity handwear and conducted a comparative handwear dexterity study (Reference 1), which resulted in one of the configurations, Mod III, proving to be superior in manipulatory capabilities to the current standard fire proximity handwear.

In this connection, recommendations were made to: (1) refine the Mod III design; (2) manufacture additional quantities for service evaluation; and (3) establish more definitive parameters of thermal protection. Although the expectant thermal protection of Mod III was assumed to be equal to the current standard, no thermal criteria were established. Thus, a program was established to produce improved prototypes (Mod IV) of the Mod III model and to manufacture additional quantities for further testing.

This report, in brief, describes the work accomplished during the period of October 1976 through September 1977.



Figure 1. Final Prototype of Improved Model of Aluminized Firemen's (Fire Proximity) Handwear.

## SECTION II

### DISCUSSION

The basic design of the Mod III model is a four-compartment configuration which contains individual compartments for each of the first three digits (thumb, index and middle finger) and a fourth compartment for the fourth and fifth digits (ring finger and pinky).

Since earlier test results (Reference 1) showed that the Mod III model had better manipulatory characteristics than the old and new standard aluminized firefighters handwear, no major design changes were considered. NCTR, in fact, decided to incorporate only minor design refinements for a more accurate fit and to concentrate on more efficient fabricating techniques to reduce cost and ensure ease of construction on a production-run basis. In addition, further analysis and utilization of the latest developments in aluminized and fire-resistant materials were planned to provide optimum thermal protection to the wearer.

During development of the Mod IV configuration, the basic design of the Mod III model was maintained. Minor modifications were made to improve the overall fit, and patterns were graded and prepared in four sizes (small, medium, large, X-large) to cover a broader user range. The current standard handwear does not have an extra-large size, primarily because of logistic problems; however, this size has once again been added for those who require it.

Samples of the final prototype (Figure 1) were fabricated in the four sizes and a good fit was achieved for all. The basic materials selected for these samples are an aluminized asbestos/aramid (14.5 oz) plain weave (Reference 2) as the outer material and an interlining material of chloroprene-coated, flame-resistant, (5.5 oz) nylon taffeta (Reference 3) as the moisture barrier element. The lining, a cotton/wool (40 percent/60 percent) knitted fleece material, serves as the insulating medium. The palm of the glove consists of a fire-resistant split cattlehide for better gripping qualities, and a flame-resistant cotton sateen (10.5 oz) material (Reference 4) is used as the lining for the gauntlet.

To improve finger dexterity, the aluminized outer material and the moisture barrier fabric were cut on the bias on two of the samples produced. The other two pairs were cut conventionally with the warp running along the length of the gloves. Preliminary fittings of gloves using both methods indicated that increased dexterity should result by cutting the materials on the bias.

A contract was awarded for 50 sample pairs of the improved final prototype, and two first article samples were produced and approved prior to production. Technical assistance was rendered by NCTR<sup>F</sup> personnel at the contractor's plant and the resultant pre-production samples were properly sized and fabrication procedures were resolved to assure optimum efficiency in production. Half the quantity is being cut on the bias and the balance with the warp along the length of the gloves. Delivery of the 50 pairs of gloves will be made during the first quarter of FY78. At that time NCTR<sup>F</sup> plans to conduct a service evaluation to establish more definitive thermal protection parameters.

SECTION III  
CONCLUSIONS AND RECOMMENDATIONS

Judging from preliminary fittings of the improved final prototype and the pre-production samples, the manipulatory capabilities of this configuration should be superior to the Mod III model.

As originally planned, a service evaluation should be performed on the 50 sample pairs currently being produced under contract, and more conclusive thermal protection parameters should also be established, with a view towards possible adoption of this new configuration as a replacement for the standard fire proximity handwear.

REFERENCES

1. Andruk, F.S., Shampine, J.C. and Reins, D.A., "Aluminized Firemen's (Fire Proximity) Handwear: A Comparative Study of Dexterity Characteristics," NCTR Report No. 121, July 1976.
2. Military Specification MIL-C-29143, Cloth, Coated, Asbestos/Aramid, Plain Weave, Aluminized.
3. Military Specification MIL-C-19699, Cloth Coated (Nylon Taffeta).
4. Military Specification MIL-C-43122, Cloth Sateen, Cotton, Flame Resistant Treated.

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